

**Statement for the Assistant Secretary for Environmental Management  
To the  
Defense Nuclear Facilities Safety Board  
July 19, 2006 Public Meeting - Safety in Design**

Mr. Chairman and Members of the Defense Nuclear Facilities Safety Board:

Thank you for this opportunity to provide testimony describing the actions taken by the Office of Environmental Management to integrate safety in design and construction. I will discuss how EM intends to “institutionalize” the design processes and products needed to successfully reduce the risk of developing additional safety-related design issues during the facility life-cycle.

As I have stated previously, EM is aware of the importance of integrating nuclear safety and project management and we firmly understand that safety is more than a priority-it is a core value of the Department. In particular, we understand the importance of:

- Integrating safety early in the design and the subsequent implementation of the design during the construction and startup of the facility recognizing that safety analysis and design development must progress together in an iterative process;
- Defining the complete set of safety requirements early in a project's life cycle and then maintaining configuration control through design, construction, operation, and ultimately, to decommissioning;
- Establishing an appropriate safety strategy including identification of safety class and safety significant structures, systems, and components for nuclear projects, early in a project's life; and
- Ensuring that our Federal Project Directors and Integrated Project Teams have the necessary training and experience to ensure successful integration of safety and design and minimize the risk of safety-related design issues occurring later.

My memorandum of February 10, 2006, establishes my expectations related to integrating safety into design and construction. These include:

- Fully integrating safety into design early in the project. Analysis, design, and procurement specification work must be complete and reviewed for quality early enough to be used as the basis for key decisions.
- Ensuring line organizations follow the requirements defined in the project management order and manual (DOE O 413.3, Program and Project Management for the Acquisition of Capital Assets, and DOE M 413.3-1, Project Management for the Acquisition of Capital Assets).
- Line project teams have the necessary experience, expertise, and training to understand the principles of integrating safety into design and construction.

- The Central Technical Authority and Chief of Nuclear Safety will provide safety oversight of projects.
- Staff work and presentations to both the Energy Systems Acquisition Advisory Board and EM Acquisition Advisory Board include a discussion of relevant safety issues.
- DOE/EM learns effectively from its projects and that this knowledge is successfully disseminated and applied. Lessons learned from prior experience and the experiences of others are reflected in systematic improvements to processes and procedures for designing and constructing defense nuclear facilities.
- Continuation of efforts to provide any additional guidance to strengthen safety integration into the early phases of design.

EM has made significant progress, but more work needs to be done to successfully integrate safety into design and construction. To date, we have taken action to:

1. Enhance Integrated Project Teams and Federal Project Directors' Knowledge of Safety and Design Integration

The Department's Federal Project Director Certification process ensures that the FPDs have the necessary training and experience requirements in the area of safety and design. EM, through the certification process, has confirmed that the FPDs have the necessary training and experience to ensure effective integration of safety and design. The Project Management Career Development Program Certification and Equivalency Guidelines require the following areas an individual must possess depending on which of the four levels of certification is needed. They include Integrated Safety Management, Systems Engineering, Design Process, and Design of Safety Systems. We have undertaken a review of the Integrated Project Teams, especially projects requiring nuclear facility expertise, to assure they are appropriately staffed with sufficient expertise in a wide variety of disciplines such as ventilation/confinement, nuclear safety, fire protection, operations, and systems engineering. In some cases, we have found it necessary to seek additional expertise and have undertaken actions to fill critical safety positions.

It is my expectation that the Federal Project Directors and Integrated Project Teams will ensure that the appropriate level of expertise is available in the areas of design, systems engineering, safety systems design, and integrated safety management. The IPT must possess the requisite skills for safety basis authorization which could be vested in the FPD or one or more of the IPT members.

EM met its goal of certifying Federal Project Directors for all 88 projects. Training gaps have been identified for select FPDs. None of these gaps are specifically related to safety-in-design issues. To address the additional training requirements, EM has prepared specific training plans to correct any deficiencies and the FPDs have been allowed one year to complete the required training from

the time of their certification. We are continuing to evaluate the IPTs to ensure they include the necessary expertise and to monitor the effectiveness of these actions through the DAS for Safety Management and Operations.

2. Enhance the Central Technical Authority and Chief of Nuclear Safety Involvement in Nuclear Projects

The annual ISMS declaration is being coordinated with the Chief of Nuclear Safety (CNS) for the ESE Central Technical Authority (CTA) as part of implementing the Board Recommendation 2004-1 (“Oversight”). The CTA was briefed on the status of the Salt Waste Treatment Processing facility seismic design issues in October 2005. At that meeting the Central Technical Authority concurred with EM to pursue a more conservative Performance Category 3 for SWPF. The CTA has also directed the Chief of Nuclear Safety to provide technical support to the Independent Project Review Teams. The first scheduled review will be SWPF in September of this year. In addition to participation in the project teams, the CNS is also supporting EM management in the delineation of better nuclear safety expectations that will be developed to reduce safety issues during the design process. Long term impacts will be evaluated through management reviews and lessons learned from project execution.

3. Reissue the EM Acquisition Advisory Board (EMAAB) Equivalent Process

At this time, EM has implemented a protocol to be formally instituted in a charter for an internal acquisition advisory process for line item and cleanup projects. This process complies with DOE Order 413.3. To date, the EMAAB process has been completed for the Demonstration Bulk Vitrification System Project at the Office of River Protection and the Sodium Bearing Waste Project in Idaho among others.

4. Develop Lessons Learned for Recently Completed Nuclear Projects Review

Weekly progress meetings continue to be implemented by EM’s Chief Operating Officer with key field personnel to provide technical direction and support on all critical projects.

The Deputy Assistant Secretary for Safety Management and Operations, working closely with the Office of Project Management Oversight has been directly engaged with IPTs during the design process for several high priority EM nuclear facility projects. These include the Salt Waste Processing Facility (Savannah River), the DUF6 Conversion Facility (Paducah and Portsmouth), Sodium Bearing Waste Treatment Facility (Idaho), K-Basins Sludge Treatment (Hanford), and Bulk Vitrification Facility (Hanford). EM field and headquarters have communicated on important design decisions during early phases of the project, including the appropriate seismic design pedigree for buildings and safety systems. Lessons learned from projects at one site have been shared directly with Integrated Project Teams at other sites.

Positive design practices have been noted at several EM projects. For example, the Demonstration Bulk Vitrification System Project at Hanford benefited from an integrated team when conducting process hazard and operability analysis on the facility design. The effort was focused on engineered safety features such as active confinement systems and involved a total of 14 individuals from operations, engineering, nuclear safety, environmental, radiological control, industrial safety, and others. This enhanced IPT process was briefed to the DNFSB and received a very positive feedback.

Another positive example is the Sodium Bearing Waste Project, which had timely integration of not only safety into the design, but also other risk mitigating features. The project also incorporated lessons learned from the SWPF, WTP, and HEU storage project at Y-12. The IPT, in conjunction with EM-HQ, incorporated into the design process, risk mitigation actions to address both SBW product disposition and enhanced structural design for the process cells (e.g., seismic and shielding) to accommodate potential future processing of calcine wastes. An independent team of seismic experts has conducted a review of the seismic conditions at the proposed facility. Their recommendations have been incorporated into the geotechnical studies at the project. A decision to accommodate additional design and operating margins to mitigate both the regulatory and future missions was made as part of the project CD process earlier this year. Additionally, the overall safety strategy, including seismic performance category, was briefed to the Board and received a favorable remarks by the Board Members. Another key to the design and safety basis development is the Hazen pilot plant program. Two pilot plant test campaigns have been conducted in 2005 and 2006. The pilot plant is a 1/10th scale unit of the SBW facility. Results of the test campaigns are a key part of the design process and verification/validation of the safety assumptions and system performance evaluation.

Lessons are disseminated directly to the Field Office Managers and Federal Project Directors through biweekly meetings with EM's Chief Operating Officer as well as the DAS for Safety Management and Operations.

#### 5. Reduce project technical risk through External Technical Reviews

EM believes strongly in reducing the technical risk of our projects and has initiated external technical reviews as one of several steps to ensure the timely resolution of engineering and technology issues. EM recently completed a successful review of the technical issues at the Waste Treatment Plant using expert engineers and scientists from private industry and academia. EM is leading two more external technical reviews of the Demonstration Bulk Vitrification System at Hanford and of Tank 48 at Savannah River. EM is working closely with our Federal Project Directors to review such issues as nuclear safety, systems integration, design, operations, maintenance, and

technology development. Additional external technical reviews will be conducted to support key project decisions and will be a mainstay of our program.

6. Continue Effort to Improve Guidance on Integrating Safety Into Design and Construction

EM now requires, as part of the annual ISMS declaration<sup>1</sup>, demonstration of how the ISM functions are implemented for design/construction projects. It is my belief that ISMS is not just for facility operations, but also extends to design and construction. Another action has to do with establishing a systematic process for delegating approval authorities to field managers that requires consideration of available safety expertise. Facility design decisions are monitored directly by designated Safety Basis Review Teams that are comprised of multi-disciplined personnel with expertise in areas such as fire protection, industrial hygiene, health physics, nuclear safety, chemical safety, and criticality safety. These teams are established early in the design process and conduct reviews of project safety documents such as hazards analysis, Preliminary Documented Safety Analyses, and system design documents. At a minimum, a preliminary list of Safety Structure Systems and Components and their safety functional requirements and design pedigrees (e.g. Seismic performance) must be developed as early as possible: by CD-1. Review teams meet periodically with the project director at each Critical Decision to ensure that the facility design is compliant with appropriate safety standards.

EM continues to work with other Departmental elements to increase safety assurance in design. Some of the actions undertaken to date include development of deterministic safety design criteria and conceptual functional requirements for safety related systems, structures, and components to be applied no later than Critical Decision-1; better defining the expectations in DOE O 420.1B *Facility Safety* and associated standards/guides on natural phenomena performance categories and other safety functional requirements for worker protection; developing guidance on the definition of "major modifications" to existing facilities to ensure correct application of nuclear safety design requirements.

EM has also issued a guidance document entitled, "Interim Guidance on Safety Integration into Early Phases of Nuclear Facility Design,"<sup>2</sup> to the field with concurrence from the CNS. The guidance encourages additional emphasis and focus on safety during the early stages of project design, particularly at Critical Decision-1 and a more prescriptive approach on selection and design of safety systems for Hazard Category 2 and 3 facilities. For example, Hazard Category 2 facilities that process readily dispersible forms of radiological material would, at a minimum, select fire protection and confinement ventilation systems as safety

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<sup>1</sup> Fiscal Year 2005 Annual Integrated Safety Management System Declaration, September 27, 2005; and Fiscal Year 2006 Annual Integrated Safety Management System Declaration, July 13, 2006, both signed by Dr. Inez Triay, EM Chief Operating Officer.

<sup>2</sup> The EM Chief Operating Officer issued interim guidance on July 18, 2006.

systems, unless otherwise justified through a technically sound exemption including PHA results.

7. Participate in Revision to DOE 413.3 and DOE M 413.3-1

EM personnel have been working with the Office of Engineering and Construction Management and the Office of Environment, Safety and Health on the revision of DOE Order 413.3 since our last public meeting. The revision process has extended over seven months and has entailed the issuance of two formal REVCOM drafts. We note the current draft's dependency on two associated directives that are still in the formative stages of development including DOE Standard 1189, *Integration of Safety into the Design Process* and the revised version of DOE Manual 413.3-1, *Project Management for the Acquisition of Capital Assets*. These two directives will provide necessary insight into application issues such as "tailoring", matching the capabilities of the project team to the demands of the project, and "safe harbor" methods of demonstrating that the proposed designs satisfy the environmental, safety, and health requirements that have been established. EM also advocates the inclusion of a chapter in the Manual regarding the management of our cleanup projects. I believe that this chapter should be included so that we can manage the majority of our projects using methods best suited to the task. I wish to assure you that EM will continue to work with other Department organizations to produce an integrated set of directives that can further improve both project management and operational safety.

8. Operational Safety Performance

In addition to our basic statistical methodology to monitoring safety performance EM has also adopted a project based approach. By using the EM Earned Value Management System (EVMS), we are now able to directly tie project performance with a contractor's safety performance. The EVMS model to normalization clearly aligns our commitment to manage safety through project performance and offers us the ability to normalize safety performance data by site, prime contractor, and corporate contractor.

Finally, I will like to quickly address how I have reorganized the Office of Environmental Management to more effectively carry out its current missions and to better organize it to undertake critical planning and development work associated with fulfilling the EM mission. This includes the establishment of EM-60, the Deputy Assistant Secretary for Safety Management and Operations. This will consolidate the safety and operations oversight within one organization. I have also established the Office of Project Management Oversight within the Deputy Assistant Secretary for Acquisition and Project Management (EM-50) to assure uniformly high quality practices are applied to project management, planning, and execution, and the Office of Engineering and Technology (EM-20) to reduce technical risk and uncertainty in the EM program and projects,

through technical reviews, assistance, and technology development and deployment. EM has also reestablished its acquisition advisory process and is continuing to work to clearly define the safety and design expectations at each critical decision.

We believe the efforts I've described have helped increase the awareness of safety and design integration and resulted in an improved safety posture at several facilities that are planned. We will continue to ensure strong interactions between DOE headquarters, field sites and design and construction contractors.

In closing, I believe these are important steps to enhancing safety integration into the entire life cycle of EM projects, from conceptual design to operation. I want to emphasize to the Board that EM remains committed to executing our projects safely and to ensuring safety is integrated early in the design process. To achieve this, I will continue to 1) strive for highly competent Federal Project Directors and Integrated Project Team members; 2) ensure the Federal Project Directors and Integrated Project Teams have the tools necessary to accomplish their task; 3) continue to work diligently with others in the Department to clarify and improve our policy and guidance; and 4) enhance EM's oversight of the project planning and execution, including timely review of the safety analysis and design criteria determinations.

I look forward to your comments and questions. Thank you.

